HOT PAPERS

The articles listed below, all less than 18 months old, have received a substantially greater number of citations than others of the same type and vintage, according to data from *The Science Citation Index* of the Institute for Scientific Information, Philadelphia. Why have these research reports become such standouts? A comment following each reference, supplied to *The Scientist* by one of the authors, attempts to provide an answer.

LIFE SCIENCES

D.W. Nebert, D.R. Nelson, M. Adesnik, M.J. Coon, et al., "The P450 superfamily: updated listing of all genes and recommended nomenclature for the chromosomal loci," *DNA*, 8, 1-13, January/February 1989.

Daniel Nebert (Laboratory of Developmental Pharmacology, National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Md.): "Cytochromes P450 are enzymes involved in the synthesis and breakdown of steroids, fatty acids, prostaglandins, leukotrienes, biogenic amines, pheromones, and plant metabolites. These enzymes also metabolize countless drugs, chemical carcinogens and mutagens, and other environmental contaminants. Currently, the P450 gene superfamily in more than a dozen species comprises more than 100 distinct genes, grouped into 17 gene families, nine of which exist in all mammals. P450 gene activation occurs in response to many diverse signals in animals, plants, and bacteria.

"The animal P450 enzymes sometimes participate in the cause of cancer or cell toxicity; other times, the enzymes participate in the detoxification of chemicals so that there is less cancer and toxicity. P450 is therefore of interest to just about every scientific discipline there is."

C.E. Wright, J.R. Fozard, "Regional vasodilation is a prominent feature of the haemodynamic response to endothelin in anaesthetized, spontaneously hypertensive rats," *European Journal of Pharmacology*, 155, 201-3, 11 October 1988.

John R. Fozard (Preclinical Research Department, Sandoz Ltd., Basel, Switzerland): "The discovery of endothelin by Yanagisawa, et al., (*Nature*, 332, 411-15, 31 March 1988), was a major development in endothelial/vascular biology. The peptide was immediately dubbed 'one of the most potent vasoconstrictors known' on the basis of both in vitro and in vivo findings. Our work, carried out in the rat with miniaturized Doppler flow probe technology, showed clearly that, depending on where in the intact cardiovascular system one looked, endothelin could show effects ranging from pure vasoconstriction (such as in the renal vascular bed) to prominent vasodilation (such as in the carotid vascular bed). The mixed vasoconstrictor/vasodilator responses to endothelin have since been confirmed in many other species; what remains to be explained is the precise mechanism or mechanisms by which they are brought about."

PHYSICS

M. Takano, J. Takada, K. Oda, H. Kitaguchi, Y. Miura, et al., "High-T_c promoted and stabilized in the Bi, Pb-Sr-Ca-Cu-O system," *Japanese Journal of Applied Physics*, 27, L1041-43, June 1988.

Mikio Takano (Institute for Chemical Research, Kyoto University, Uji, Kyoto-fu, Japan): "The high-T_c phase in the Bi-Sr-Ca-Cu-O system has two advantages in comparison with $YBa_2Cu_3O_7$: The T_c (approximately 110K) is higher and the particles are plate-like. The latter point is important from the viewpoint of practical application, because the particles can be aligned easily so that the superconducting CuO_2 planes are kept parallel from particle to particle.

"The formation process of this phase is, however, extremely slow, and the usual fabrication methods have proved to be quite inefficient to obtain the phase in its bulk form. Partial substitution of lead (Pb) for bismuth (Bi) has been found to dramatically accelerate the formation and to promote the crystalline quality as examined by various structural, electrical, and magnetic measurements. The attainment of a high purity of approximately 90% in this study established a sound base on which subsequent basic and practical studies are carried out. We later showed that the substitution modifies the crystal structure substantially, and, thus, the above study can be considered as a finding of a new superconducting phase in the Bi-Pb-Sr-Ca-Cu-O system."

• The influence of climatic warming on flowering and leaf production in trees could have considerable economic significance in both forestry and horticulture. The duration of the chill period affects the speed of response to spring warming, so prediction is complex. British studies, however, suggest that the effects of warming (increase of 3°C) will be minimal in lowland sites, but would have a marked influence on budburst in the uplands.

M.B. Murray, M.G.R. Cannell, R.I. Smith, "Date of budburst of fifteen tree species in Britain following climatic

• The fossil record of animals and plants in sediments dating from the end of the last ice age, about 10,720 solar years ago (about 10,000 radiocarbon years), indicates a rapid warming of climate at that time. Just how rapid has been demonstrated by oxygen isotope analyses of ice cores from the Greenland ice cap. During the course of only 50 years, the temperature rose by 7°C.

W. Dansgaard, J.W.C. White, S.J. Johnsen, "The abrupt termination of the Younger Dryas climate event," *Nature*, 339, 532-4, 15 June 1989. (University of Copenhagen, Denmark; University of Colorado, Boulder; University of Ice

components than into small ones. It also highlights potential trouble spots arising when some node is not tightly connected to the rest of the network.

D.B. Skillicorn, B. Kocay, "A global measure of network connectivity," *Journal of Parallel and Distributed Computing*, 7, 165-77, August 1989. (Queen's University, Kingston, Ontario; University of Manitoba, Winnipeg, Canada)

• Modification of expert systems, as any software, often introduces errors. An experimental study shows the value of using

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